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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/738,467	12/15/2000	Joseph Gerald Marcinkiewicz	K315.106.101	9674

7590 02/23/2004

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EXAMINER	
PHAM, THOMAS K	

ART UNIT	PAPER NUMBER
2121	20

DATE MAILED: 02/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/738,467	MARCINKIEWICZ, JOSEPH GERALD	
	Examiner	Art Unit	
	Thomas K Pham	2121	

-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Notice to Applicant(s)

1. This action is in respond to the request for continued examination filed on 01/30/2004.

2. Claims 1-24 are presented for examination.

3. The declaration under 37 CFR 1.132 filed 12/22/2003 is sufficient to overcome the rejection of claims 1-24 based upon Applicant Admitted Prior Art (AAPA). However, upon further consideration, a new ground(s) of rejection is made in view of Nygren et al. U.S. Patent No. 6,525,504.

DETAILED ACTION

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-3, 23 and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Nygren et al. U.S. Patent No. 6,525,504 (hereinafter Nygren)

Regarding claim 1

Nygren teaches a brushless electrical machine comprising:

- a rotor, a stator, at least one phase winding arranged to establish flux in a magnetic circuit in the machine (abstract);

- producing a signal indicative of flux-causing voltage across the at least one phase winding (col. 15 lines 41-57, "The auxiliary winding 30 ... via auxiliary winding 30").

Regarding claim 2

Nygren teaches

- producing the signal indicative of the flux-causing voltage is operably coupled with the or each phase winding (col. 15 lines 50-57, "The main winding 29 ... the machine via auxiliary winding 30").

Regarding claim 3

Nygren teaches

- a search coil arranged in relation to the magnetic circuit to produce the signal indicative of the flux-causing voltage (col. 8 lines 51-56, "by introducing an auxiliary winding ... can be greatly simplified").

Regarding claim 23

Nygren teaches a method for controlling a brushless electrical machine having

- a rotor, a stator and at least one phase winding (abstract);
- producing a feedback signal including a part indicative of the flux-causing voltage across the or each phase winding (col. 15 lines 41-57, "The auxiliary winding 30 ... via auxiliary winding 30" and fig. 2A showed feedback from the exciter 1 back to the regulator 2);
- producing an input signal representing the demanded output of the machine (fig. 2A regulator 2 accepted input from elements 3,4 and 5); and

- controlling energization of the at least one phase winding in response to the input signal and the feedback signal (col. 8 lines 51-56, "by introducing an auxiliary winding ... can be greatly simplified").

Regarding claim 24

Nygren teaches a brushless electrical machine comprising:

- a rotor, a stator, at least one phase winding arranged to establish flux in a magnetic circuit in the machine (abstract); and
- a signal producer arranged in relation to the magnetic circuit for producing a signal indicative of flux-causing voltage across the at least one phase winding (col. 15 lines 41-57, "The auxiliary winding 30 ... via auxiliary winding 30").

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 4-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nygren in view of Lovett et al. U.S. Patent No. 6,225,767 (hereinafter Lovett).

Regarding claim 4

Nygren teaches a brushless electrical drive system comprising: a brushless electrical machine having a rotor, a stator and at least one phase winding arranged to establish flux in a magnetic circuit in the machine (abstract); means for determining flux-causing voltage across the or each

phase winding and producing a feedback signal representing the flux-causing voltage (col. 15 lines 41-57, "The auxiliary winding 30 ... via auxiliary winding 30") but does not teach a flux controller having an input signal representing the demanded output of the machine, which controller is responsive to the input signal and the feedback signal to produce control signals for actuating switch means to control the flux in the at least one phase winding. However, Lovett shows a system comprising: a flux controller having an input signal representing the demanded output of the machine, which controller is responsive to the input signal and the feedback signal to produce control signals for actuating switch means to control the flux in the at least one phase winding (col. 5 line 65 to col. 6 line 10, "Turning to the drawing ... follows the flux command 13"). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the flux controller of Lovett with the brushless electrical machine of Nygren because it would provide for energizing the electro-magnetic system as it provides phase coil energization signals to the system.

Regarding claim 5

Nygren teaches determining the flux-causing voltage include transducer means operably coupled with the or each phase winding. (col. 7 lines 45-51, "Terminal voltage transducer ... from the generator terminal").

Regarding claim 6

Lovett teaches a system in which the transducer means includes a search coil (col. 12 lines 28-30, "search coil using a ... directly form the coil").

Regarding claim 7

Lovett teaches a flux estimator including means for deriving a flux signal proportional to the flux in the or each phase winding from the feedback signal (col. 16 lines 57-65, "The flux estimate commands ... energization control circuit 21' ").

Regarding claim 8

Lovett teaches a voltage model of the machine for producing the feedback signal (col. 12 lines 31-43, "the phase current is applied ... for each phase windings").

Regarding claim 9

Lovett teaches a system in which the voltage model includes a thermal model of the or each phase winding (col. 12 lines 43-47, "The current compensation ... DC voltage injection").

Regarding claim 10

Lovett teaches a system in which the means for deriving the flux signal includes an integrator arranged to integrate the feedback signal to produce the flux signal (col. 11 lines 35-40, "FIG. 3A generally illustrates ... of four voltage input signals").

Regarding claim 11

Lovett teaches a system in which the estimator includes means for resetting the integrator at a point of substantially zero phase current in the cycle of the or each phase of the machine (col. 11 lines 24-34, "A conventional open-loop integrator ... to zero may be used").

Regarding claim 12

Lovett teaches a system in which the means for deriving the flux signal includes a low-pass filter arranged to filter the feedback signal to produce the flux signal (col. 13 lines 8-15, "FIG. 3B generally illustrates ... bi-polar excitation currents").

Regarding claim 13

Lovett teaches a system in which the estimator includes a current model of the machine arranged to receive signals representing phase current and rotor position and being operable to produce a flux estimate for the or each phase winding therefrom (col. 12 lines 31-40, "the phase current is applied ... electromagnetic system 15").

Regarding claim 14

Lovett teaches a system in which the current model includes an algebraic estimate of the flux in the or each phase winding based on inputs of phase current and rotor position (col. 12 lines 48-62, "it will be noted that ... voltage applied to the phase coils").

Regarding claim 15

Lovett teaches a system in which the estimator includes comparator means for producing a current model error signal from the flux estimate and the feedback signal (col. 9 lines 19-39, "In general, when the magnitude of ... the electromagnetic system (and, thus, the flux) down").

Regarding claim 16

Lovett teaches a system in which the current model is an inverse current model (col. 9 lines 31-39, "When the magnitude of ... the electromagnetic system (and, thus, the flux) down"), including an algebraic estimate of the current in the or each phase winding based on inputs of rotor position and estimated phase flux (col. 12 lines 48-62, "it will be noted that ... voltage applied to the phase coils").

Regarding claim 17

Lovett teaches the estimator includes comparator means for producing an inverse current model error signal from the current estimate and monitored current in the or each phase winding (col. 9 lines 31-39, "When the magnitude of ... the electromagnetic system (and, thus, the flux) down").

Regarding claim 18

Lovett teaches a system includes a voltage model of the machine for producing the feedback signal (col. 12 lines 31-43, "the phase current is applied ... for each phase windings"), further in which the estimator further includes means for summing output of the voltage model and differentiated output of the current model to produce the feedback signal (col. 11 line 56 to col. 12 line 6, "the $+V_{DC}$ signal is ... at its output").

Regarding claim 19

Lovett teaches a system in which the estimator further includes a current model, controller arranged to apply a control law function to current model output (col. 25 lines 1-15, "When the position/velocity ... instantaneous command signal").

Regarding claim 20

Lovett teaches a system in which the current model controller has a response to machine speed such that a current model output signal is increasingly attenuated with increasing machine speed above a predetermined machine speed (col. 21 lines 4-26, "While the force control ... be welded to one another").

Regarding claim 21

Lovett teaches a system includes a voltage model of the machine for producing the feedback signal (col. 12 lines 31-43, "the phase current is applied ... for each phase windings"), the system further including means for causing output of the current model to dominate output of the voltage model at relatively low machine speeds, and for causing output of the voltage model to dominate output of the current model at relatively high machine speeds (col. 21 lines 4-26, "While the force control ... be welded to one another").

Regarding claim 22

Lovett teaches a system in which the input signal represents a flux demand, the flux controller further including a comparator for comparing determined flux with demanded flux to produce the control signals (col. 8 lines 33-50, "the illustrated flux controller 12 ... energization control circuit 21").

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner *Thomas Pham*; whose telephone number is (703) 305-7587 and fax number is (703) 746-8874, Monday-Thursday and every other Friday from 7:30AM- 5:00PM EST or contact Supervisor *Mr. Anil Khatri* at *(703) 305-0282.*

Any response to this office action should be mailed to: **Director of Patents and Trademarks Washington, D.C. 20231**, or **Hand-delivered** responses should be brought to **Crystal Park II, 2121 Crystal Drive Arlington, Virginia, (Receptionist located on the 4th floor),** or fax to the **official fax number (703) 872- 9306.**

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

Thomas Pham
Patent Examiner

TP
February 20, 2004

Ramesh Patel 2/20/04
RAMESH PATEL
PRIMARY EXAMINER
for Anil Khatri